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FIG. 1

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FIG. 2

3/71

FIG. 3

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FIG. 4

5/71

FIG. 5

FIG. 6

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300

302

316

312

310

314

304

308

306

318

122

FIG. 7

320

Diagnostic
Port — 322

324 — HM Board
(Firmware)

328 — Asynchronous Interprocessor Communications

A/D
Conversion

330

326 — Main Control
Board
(Firmware)

Pulse Width
Modulator
(Speed
Control)

362

Digital Inputs
& Relay
Outputs — 338

— FF Temp 2 —332
— FF Temp —332
— Feature Pan Temp—276
— FZ Temp —334
— Evap. Temp—336

— Cond. Fan Tach.—340
— Evap. Fan Tach.—342
— Crusher Solenoid—344
— Auger Motor —346
— Personality Inputs (Site Specific)—348
— Water Dispensor Valve—350
— Encoders for Set Points—352
— Compressor Cntl—354
— Defrost Heater—356
— Door Detector —358
— Mullion Damper —360
— Feature Pan Damper 1—260
— Feature Pan Damper 2 —266
— Feature Pan Heater —270

364

— Condensor Fan
— FF Fan—366
— Evaporator Fan
— Feature Pan Fan

368
274

FIG. 8

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DISPENSER BOARD — 396

Quantum BPO

MAIN BOARD
- Mounts all components
- Provides interconnections
- Provides external connections
- Provides electrical isolation
- Provides ground plane/shielding
- Provides attachment to structure

376

370

EEPROM
- Stores critical data

ENCODER BOARD
Leap BPO

SIGNAL CONDITIONING
- Conditions encoder signals

Digital

380

DOOR SWITCH INPUT
- Senses door switch state

Digital

382

FF and FZ Door Switches

Analog

Mux Control

384

FF THERMISTORS (2)
- Senses FF air temperature

394

386

FZ THERMISTOR
- Senses FZ air temperature

SENSOR SIGNAL CONDITIONING
- Routes thermistor MUX signals
- Calibrates thermistors
- Conditions thermistor signals

388

EVAPORATOR THERMISTOR
- Senses evap. temperature

5V

390

FEATURE PAN THERMISTOR
- Senses feature pan air temp.

AMBIENT THERMISTOR
- Senses ambient air temperature

392

Line Voltage
- 90-265Volts AC, 50/60Hz

LINE CONDITIONING
- Filters line
- Protects from surges

5V

374

FIG. 9A

- - →
TO
FIG 9B

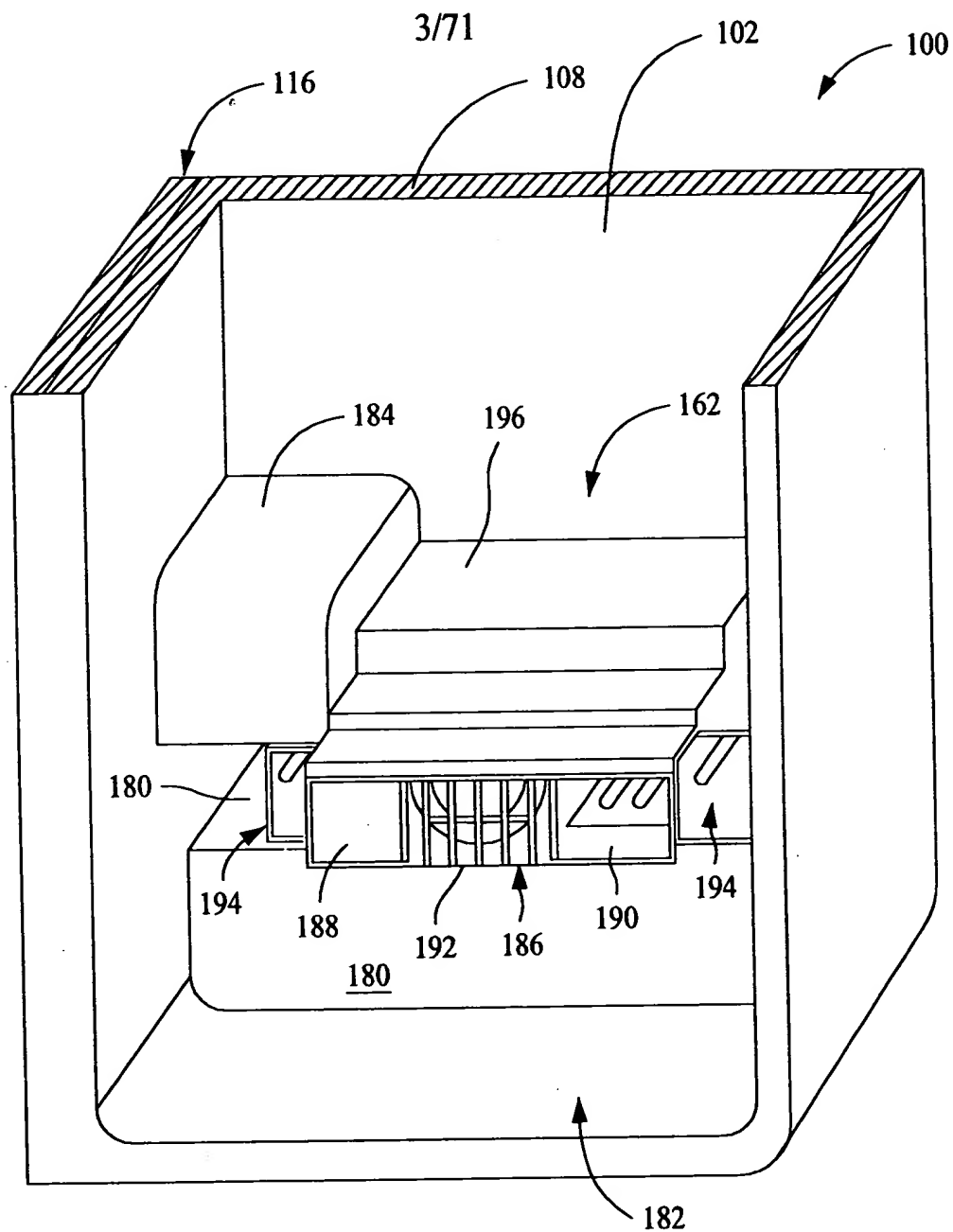Applicant: Holmes et al.; Serial No.: 09/754,600; Atty. Dkt. No.: 9D-HR-19406
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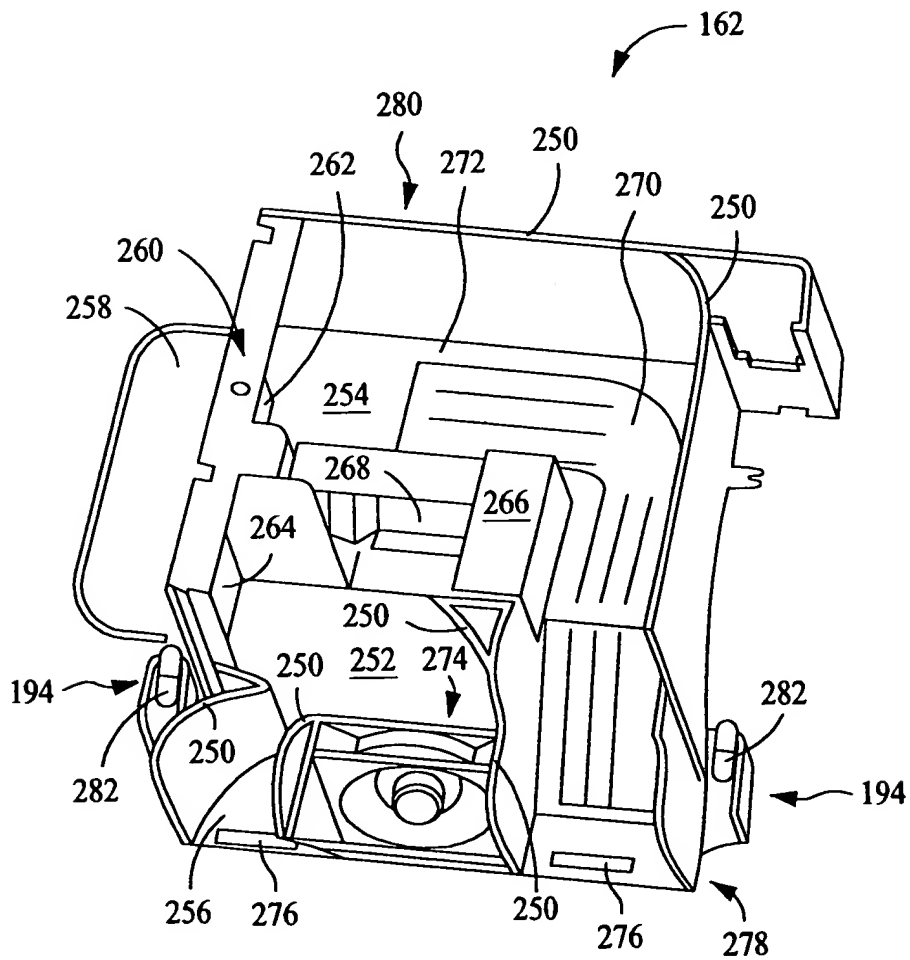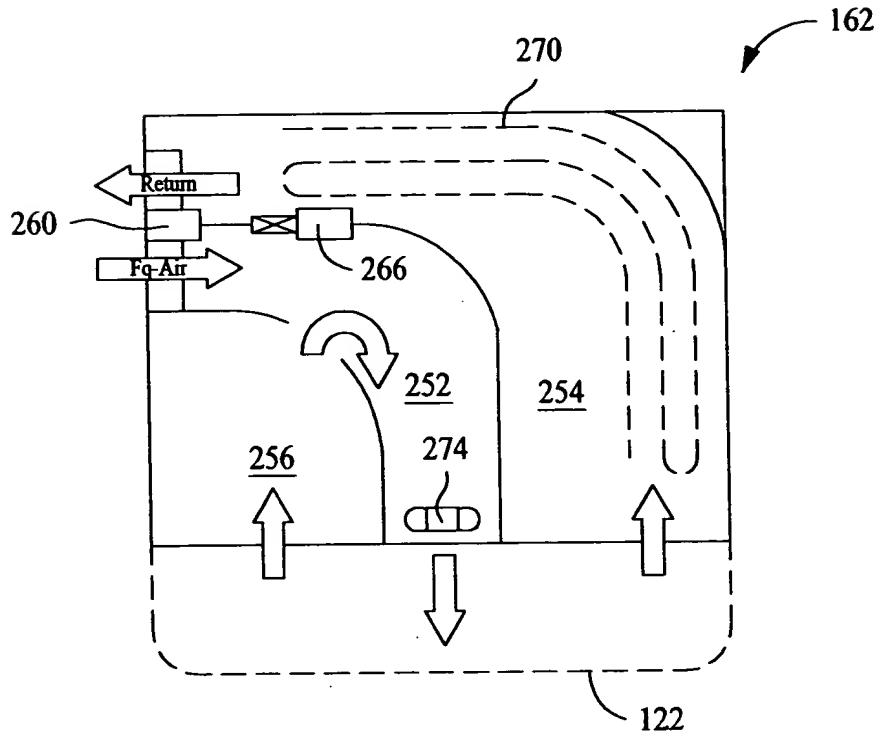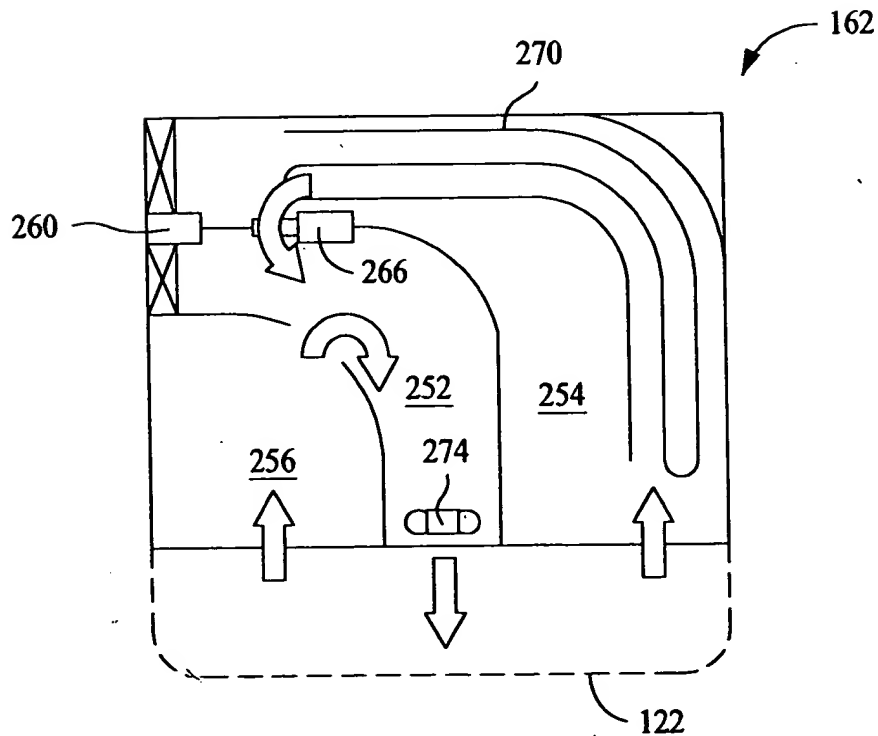St. Louis, MO 63102 (314) 621-5070

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TO
FIG 9A

USER CHILL PAN CONTROLS — 398

TEMPERATURE ADJUSTMENT BOARD
Quantum Leap

326

368 — **Evaporator Fan**

400
Serial Comm.

12V

CLOCK CIRCUIT
• Provides timer base
• Watchdog function — 378

402 — **DC FAN MOTOR CONTROL**
• Regulates voltage to DC fans

364 — **Condenser Fan**

366 — **FF Fan**

LOGIC
•Temperature Adjust/Dispenser Comm.
  • Receives/Decodes bits
  • Executes decoded data
  • Encodes messages
  • Sands bits to other modules
•AC Device Control
  • Turns on/off relays
•Signal Conditioning
  • Converts analog signal to digital
  • Controls mux
  • Processes/Filters digital signal
•Runs Algorithms
  • Sealed system control
  • Evaporator fan control
  • Defrost control
  • Feature pan control
  • FF fan control
  • Stepper motor damper control
  • Auger motor control
  • Cube/Crush solenoid control
  • Timer control
  • Self-test
•Microprocessor Hardware Watchdog
  • Configures/Resets watchdog
•Reads/Writes Critical Data to EEPROM

12V

274 — **Feature Pan Fan**

404 — **DC STEPPER MOTOR CONTROL**
• Controls DC damper

360 — **Mullion Damper**

12V

406 — **DC MOTOR CONTROL**
• Controls DC feature pan dampers

260 — **Feature Pan Single Damper**

266 — **Feature Pan Dual Damper**

12V

408 — **RELAY WATCHDOG**
• Switches power to relays

350 — **Water valves (2)**

344 — **Cube/Crush Solenoid**

AC DEVICE CONTROL
• Switches power to AC loads

410

412 — **Compressor**

346 — **Auger Motor**

414 — **Feature Pan Heater**

POWER SUPPLY
• Converts AC to DC
• Provides AC connection

12V

Quantum Lead BPO

356 — **Defrost Heater**

372

FIG. 9B

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FIG. 10

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160

260
Dual Damper

266
Single
Damper
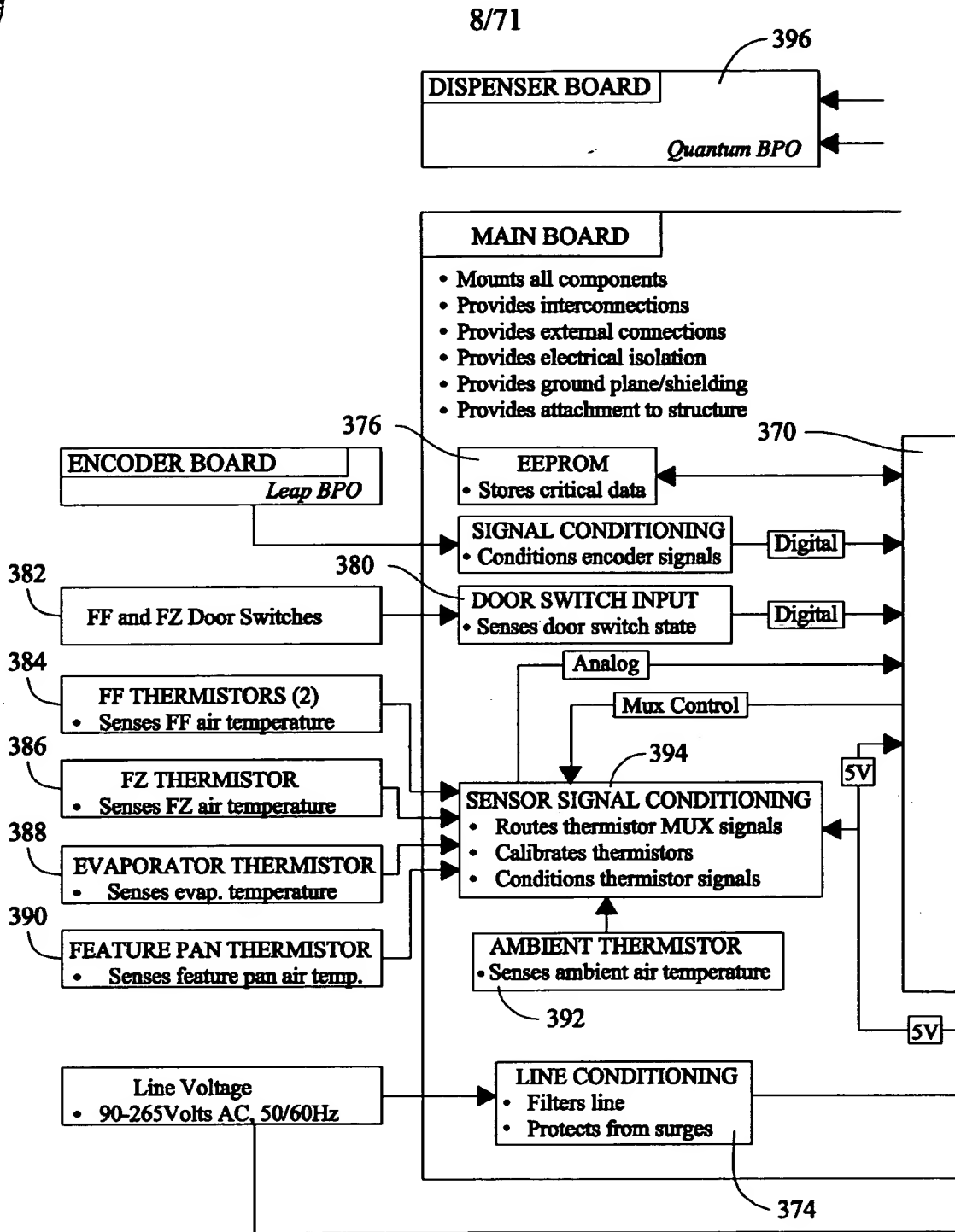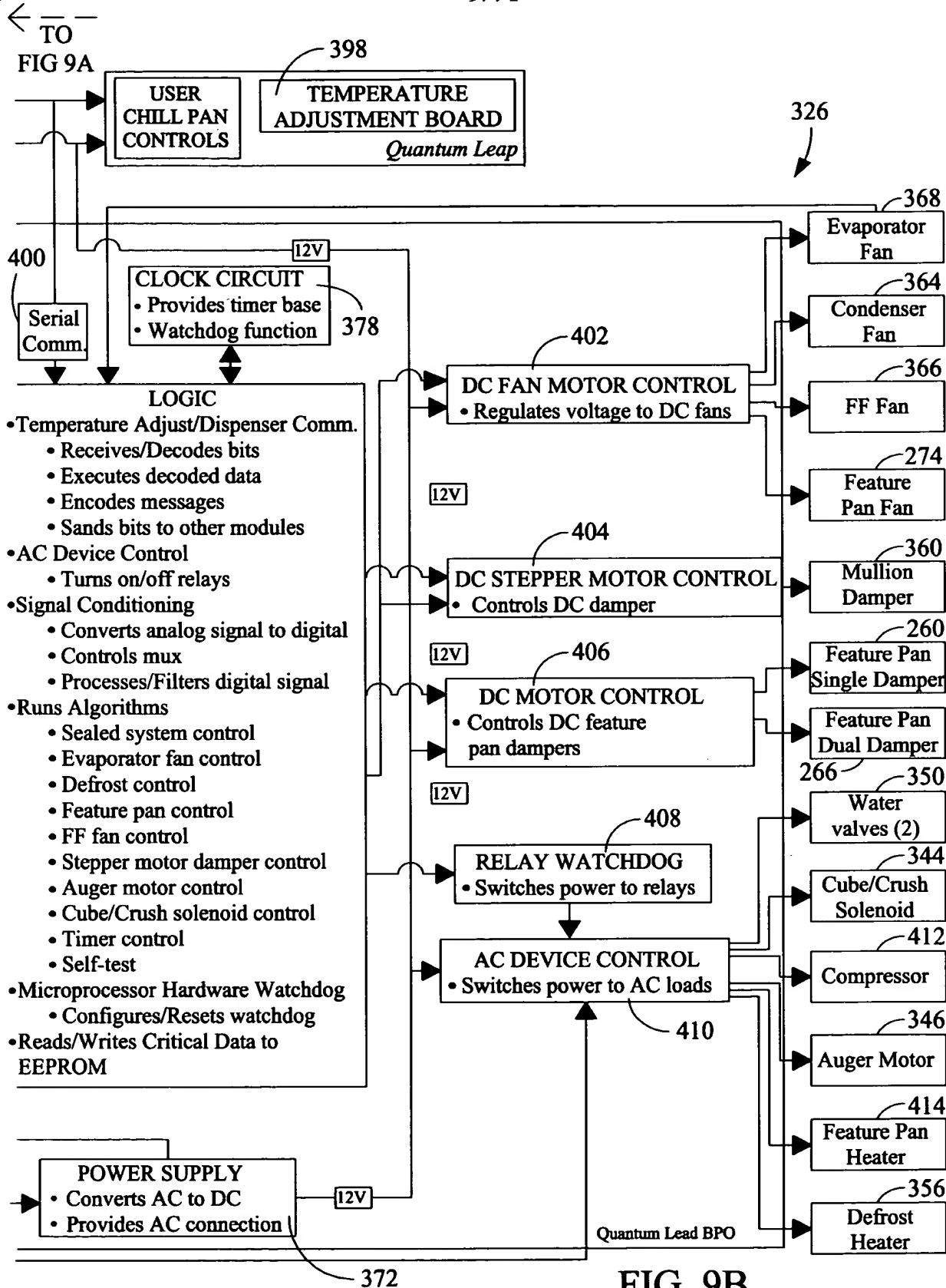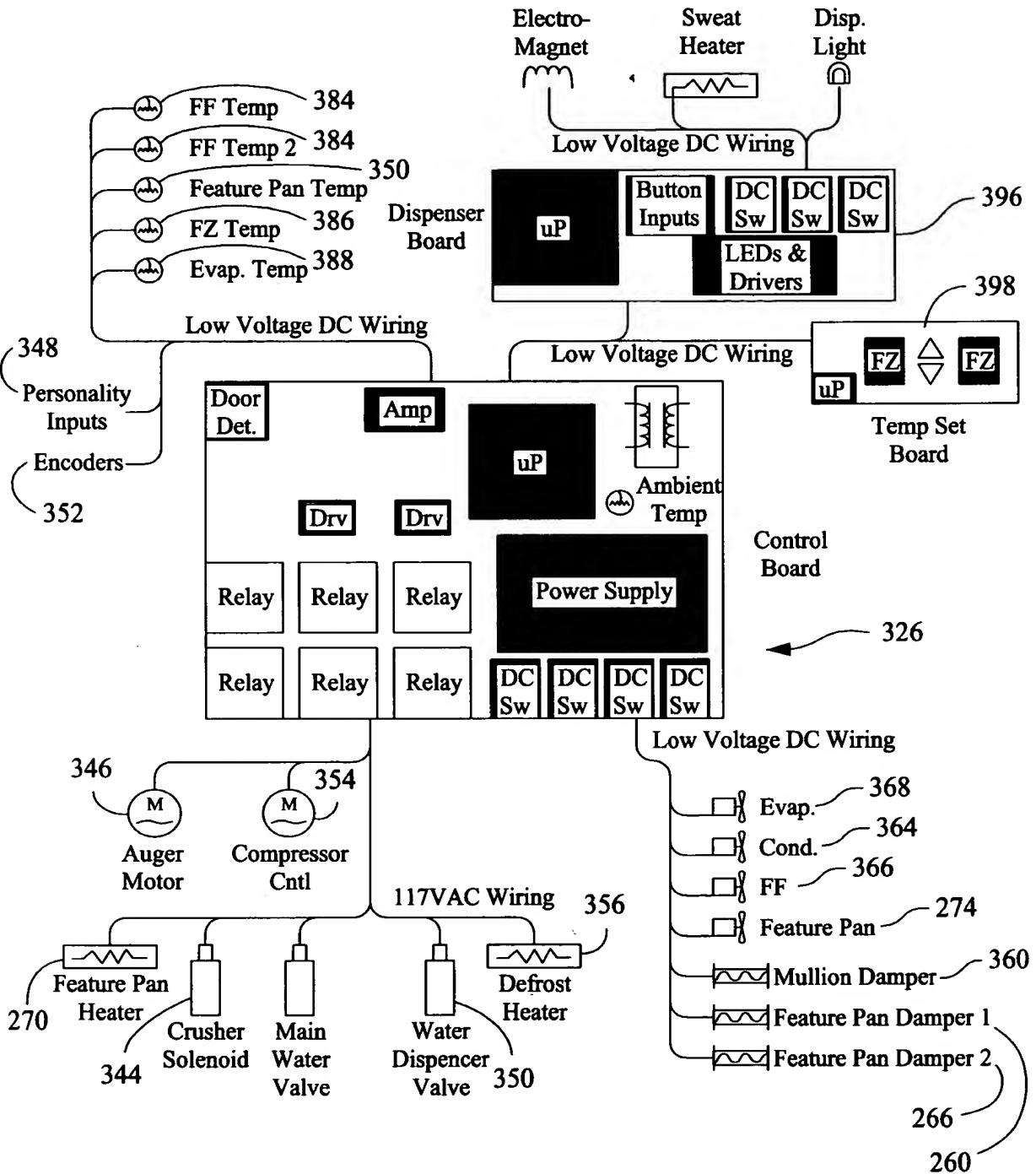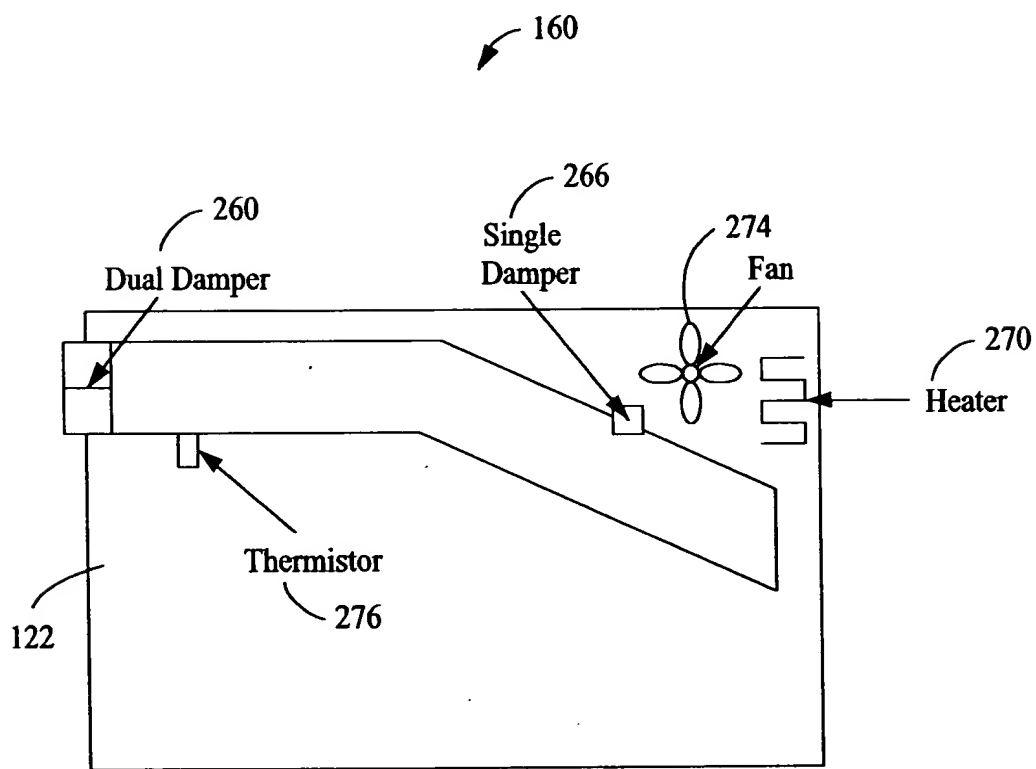
274
Fan

270
Heater

Thermistor

276

122

FIG. 11

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416

418

Initiali-
zation

Set tch per customer selected
mode(chill 1, chill 2, or chill 3)

Time ti
expired

420

Pos.
Dampers

426

Term-
inate

Delta
Temp.
Low

Dampers
Ready

Time tch
expired

Delta Temp.
Okay

422

Chill
Active

Chill
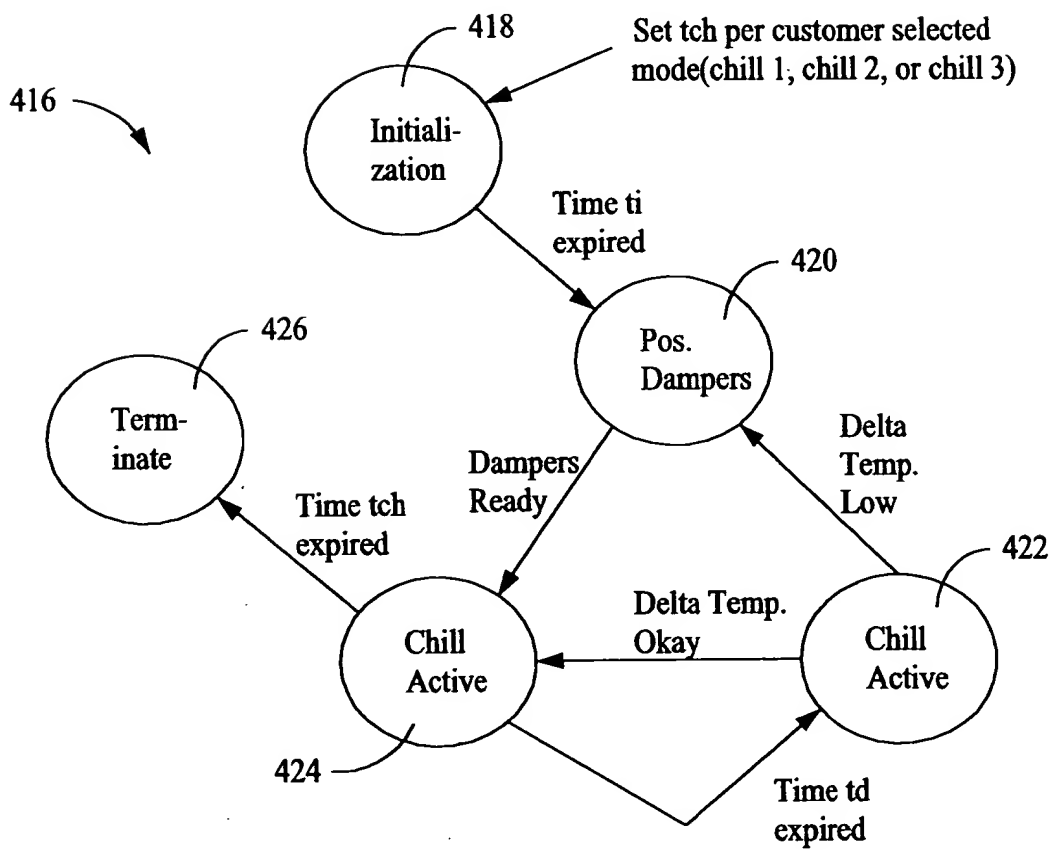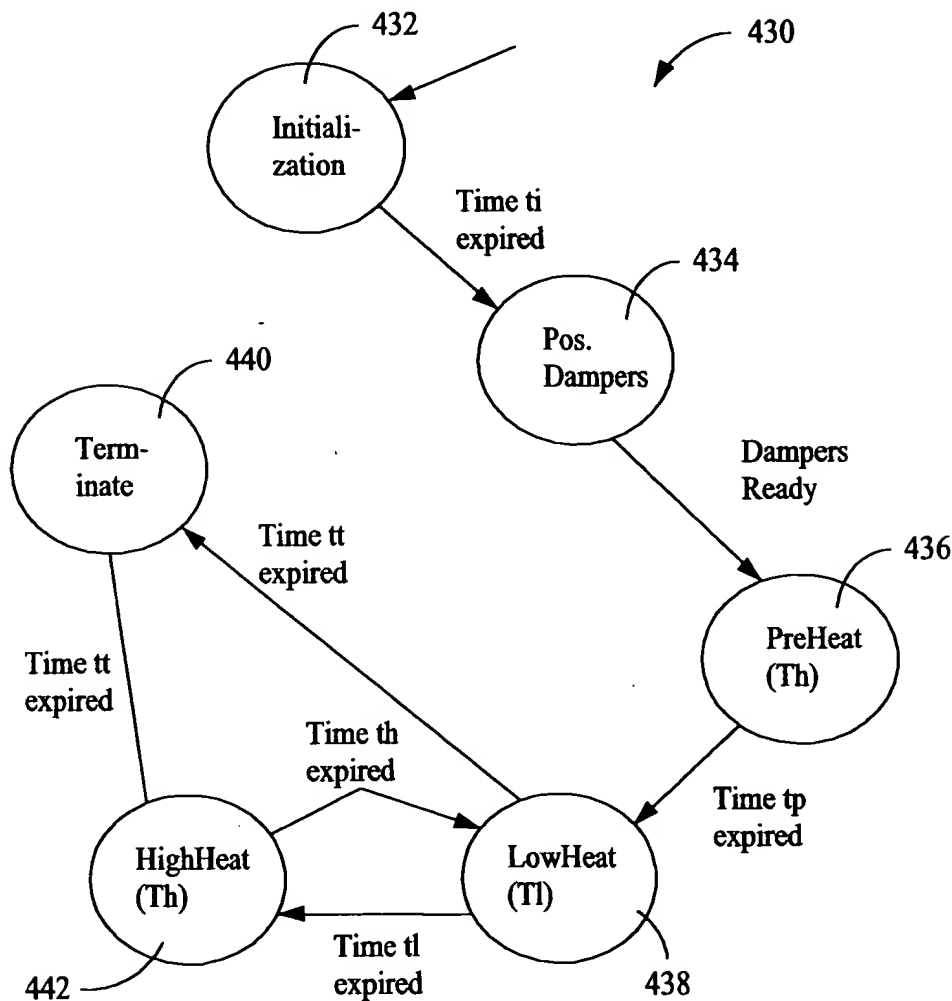Active

424

Time td
expired

FIG. 12

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Initialization: Shuts off heater and turns on fan. This mode is implemented so that the customer interface LED that is wired in parallel with the fan will turn on as soon as the button is hit. Time ti is the initialization time and will typically be approximately one minute.

Pos. Dampers: This state shuts off the fan, sets the single damper open then closes the dual damper. It then turns the fan back on. This is done for power management

PreHeat: This state regulates the pan temperature

LowHeat

HighHeat:

Terminate: This mode closes both dampers and shuts off the fan then returns to idle.

FIG. 13

14/71

444

STATE

446 CHILL_THAW

Status STATE | Status STATE | Status STATE | Status STATE

448 Init | Chill | Off | Thaw 430

416 450

Open Close | Open Close | On/Off | SetPoint

266 Single Damper | Dual Damper | Fan | Heater Control Algorithm 452

260 274

FIG. 14

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FIG. 15

FIG. 16

FIG. 17

FIG. 18A

TO
FIG 18B

Sealed System Assumptions:
- No SS Failures
- No Sensor Failures

480

USER

&

Set FZ Temp

HAND

ELECTRONICS

Stove
FZ & FF Temp
Setting

Determine if
Defrost Required (Prechill Complete?)

NO

YES

Monitor FF & FZ Temp

Above Limit

Below Limit

Start Compressor

Start Cond. Fan

Above Limit

Monitor Evap Temp

Below Limit

Above Limit

Monitor FF & FZ Temp

Below Limit

Activate
Defrost
Heater

SIGNAL

Monitor Defrost
Termination
Readiness

Not Ready

Ready

Deactivate
Defrost
Heater

SIGNAL

&

SEALED SYSTEM

&

COND.
FAN

COMP.

EVAP.
FAN

DEF.
HEATER

Stop
Cond.
Fan

Stop
Comp.

Stop
Evap.
Fan

Start
Defrost
Heater

Start
Defrost
Heater

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FIG. 18B

Sealed System Behavior Diagram

482

&

| FF FAN | ELECTRONICS | USER |

&

Store
FF Temp
Setting

(HAND) ← Set FF Temp

Below Limit & No Grad ┐

Monitor FF Temp ← Door Closed

Above Limit

Start
FF Fan ← (SIGNAL) ← Activate FF Fan

Above Limit ┐

Monitor FF Temp

Below Limit

Stop
FF Fan ← (SIGNAL) ← Deactivate FF Fan ← Door Open

&

Fresh Food Fan Behavior Diagram

FIG. 19

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DISPENSER

&

LIGHT CRUSHER BYPASS AUGER MOTOR ELECTRO-MAGNET WATER VALVES

Open Water Valves

SIGNAL

Cradle Switch

SIGNAL

Close Water Valves

Start Auger Motor Open Duct Door

Cradle Switch

Cradle Sw +5Sec

Stop Auger Motor Close Duct Door

Bypass Crusher

Cradle Switch

Use Crusher

Toggle Light

&

— — →
TO
FIG. 20B

Dispenser Behavior

FIG. 20A

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Dispenser Assumptions:
- No Sensor Failures

&

| ELECTRONICS | | USER |

	HAND	Activate Cradle Switch	HAND	Select "CUBED"
	HAND	Activate Cradle Switch	HAND	Select "CRUSHED"
Activate Water Valves	HAND	Activate Cradle Switch	HAND	Select "WATER"
Toggle Light			HAND	Activate Light
Set Keypad Lockout Mode			HAND	Press Lock for 2 Sec
Reset Water Filter Timer & Turn off LED			HAND	Depress Water Filter "Reset" for 2 Seconds

← — —
TO
FIG. 20A

&

FIG. 20B

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Dispenser Assumptions:

- **No Sensor Failures**

&

ELECTRONICS		USER

Increment FZ Set Pt EEPROM	← HAND ←	Select "Up Slew Key"
Decrement FZ Set Pt EEPROM	← HAND ←	Select "Dwn Slew Key"
Increment FF Set Pt EEPROM	← HAND ←	Select "Up Slew Key"
Decrement FF Set Pt EEPROM	← HAND ←	Select "Dwn Slew Key"
Reset Freshness Filter Timer & Turn off LED	← HAND ←	Depress Freshness Filter "Reset" for 3 Seconds
Execute Turbo Algorithm	← HAND ←	Depress "Turbo Cool"
Execute Thaw Algorithm	← HAND ←	Depress "Thaw"
Execute Chill Algorithm	← HAND ←	Depress "Chill"

&

HMI Behavior

FIG. 21

Device

14 — Dispenser Light On

6 — Open Water Valve

13 — Close Water Valve

16 — Dispenser Light Fade Out

Ctrl Board

5 — A. Acknowledge Comm. Request B. Close Water Relay

Each New Comm. Request Restarts Timer

8 — Dispense Watchdog Timer

Timer Expired

12 — Open Water Relay

Comm Port

488

4 — Send Open Water Valve

11 — Send Close Water Valve

HM

3 — A. Request Water Dispense Via Comm. Port B. Turn Dispenser Light On

Start Timer

7 — Retransmission Delay Timer

10 — A. Request All Valves Opened Via Comm. Port B. Turn Off Dispenser Light

15 — Delay Dispenser Light Turn Off For 20 Seconds

Water Dispenser Interactions

USER

1 — Select Water Button

2 — Ht Target Switch With Cup

Delay Complete

9 — Release Target Switch

17 — FZ Door Open

&

FIG. 22

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FIG. 23

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FIG. 24

Cubed Ice Dispenser Interactions

Device

16 Dispenser Light On
17 Open Duct Door
6 Start Auger Motor
13 Stop Auger Motor
15 Close Duct Door
19 Dispenser Light Fade Out

Ctrl Board

5 A. Acknowledge Comm. Request B. Activate Auger Relay
8 Dispense Watchdog Timer
12 Open Auger Relay

Each New Comm. Request Restarts Timer

Timer Expired

Comm Port

4 Send Start Auger Commands
11 Send Auger Command

492

HM

3 A. Request Auger Motor On Via Comm. Port B. Turn On Dispenser Light
7 Retransmission Delay Timer
10 A. Request Auger Off Via Comm. Port B. Turn Off Dispenser Light
14 Delay Duct Door Closing for 5 Seconds
18 Delay Dispenser Light Turn Off For 20 Seconds

Start Timer

USER

1 Select Cubed Button
2 Ht Target Switch With Cup
9 Release Target Switch
20 FZ Door Open

Delay Complete

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FIG. 25

Temperature Setting Interaction Diagrams

NOTE: Setpoint Selected implies that the final selection
has been made and that the selection has timed out.

FIG. 26 — Quick Chill Interaction Diagram

Device
11 Activates Quick Cool LED
5 Start Quick Cool Fan
9 Stop Quick Cool Fan
12 Deactivate Quick Cool LED

Ctrl Board
4 A. Acknowledge Comm. Request B. Activates Fan Drive Translator
8 A. Acknowledge Comm. Request B. Deactivate Fan Drive Translator

Comm Port
3 Send Start Quick Cool Fan Command
7 Send Stop Quick Cool Fan Command

HM1
2 Begin Quick Cool Mode
6 12 Hour Timer

USER
1 Press Defrost/Chill Button
10 Second Press of Defrost/Chill Button

Start Timer

Timer Expires

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Device

11	Activates Turbo Cool LED
5	System and All Fans on High Speed Mode (See Turbo Algorithm)
9	See Turbo Algorithm
12	Deactivate Turbo Cool LED

Ctrl Board

14	Inform Temp of Mode
4	A. Acknowledge Comm. Request B. Execute Turbo Algorithm
8	A. Acknowledge Comm. Request B. Revert to Normal Operating Mode
16	Inform Temp of Mode

Comm Port

13	Send Turbo Light Message
3	Send Enter Turbo Cool Mode Command
7	Send Exit Turbo Mode Command
15	Send Turbo Light Message

498

HM

| 2 | Begin Turbo Cool Mode |
Start Timer
| 6 | 8 Hour Timer |
Timer Expires
(+)

USER

| 1 | Press Turbo Cool Button |
| 10 | Second Press of Turbo Button |

&

Turbo Mode Interaction Diagram

FIG. 27

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FIG. 28

Freshness Filter Reminder Interaction

502

USER

HM

Comm Port

Ctrl Board

Device

| 1 |
| Press Reset Button and Hold for More Than 3 Seconds. LED flashes while button is held. |

| 2 |
| Enter Timer Reset Mode |

Reset Timer

| 3 |
| Six Month Timer |

Daily Timer Update

| 4 |
| Freshness Filter Light Off |

| 5 |
| Send Clear Timer Values to EEPROM |

| 6 |
| Clear Timer Values in EEPROM |

| 7 |
| Send Updated Timer Values to EEPROM |

| 8 |
| Log New Timer Values in EEPROM |

| 9 |
| Freshness Filter Light On |

Water Filter Reminder Interaction

FIG. 29

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USER	HM	Comm Port	Ctrl Board	Device

1
Door Alarm Enabled on Power Up

2
Door Alarm Button Pressed

3
A. Door Alarm State is Toggle (off to on, or on to off)
B. LED is on Steady when Door Alarm is Enabled, off when Door Alarm is OFF

7
Blnk Light

(+)

6
Send Message

5
Send Door Open Message

4
Door Sensor

8
Start 2 Minute Timer

Door Alarm Enabled

9
Timer Expired

11
Door Alarm Button Pressed

10
Beep Door Alarm

(+)

Door Alarm Enabled

12
Silence Door Alarm

16
Stop Alarm, Light Steady

(+)

15
Send Message

14
Send Door Closed Message

13
Door Sensor

Door Open Interaction Diagram

FIG. 30

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SS Algorithm

506
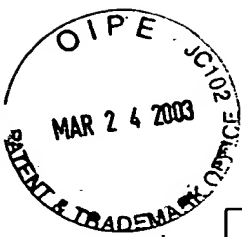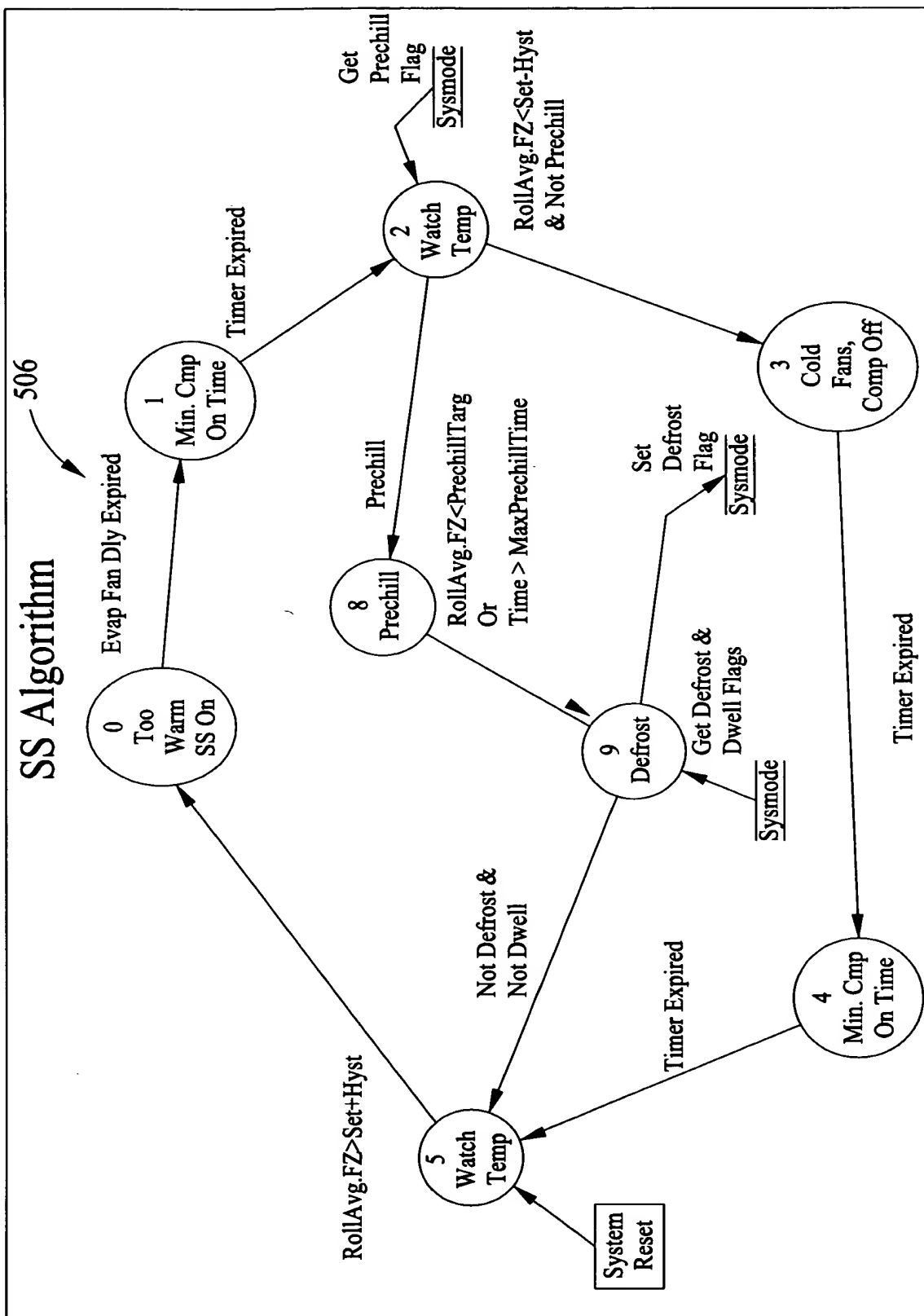
Sealed System Operational Algorithm

FIG. 31

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_508_

CRADLE SW.
DEPRESSED

↓

DEBOUNCE
KEY

↓

FORMULATE
ACTIVATE
MESSAGE

↓

SEND MSG
TO CONTROL

↓

CRADLE
DEPRESSED? —YES→ DOOR
CLOSED?

CRADLE DEPRESSED? → NO

DOOR CLOSED? → YES (back to SEND MSG TO CONTROL)

DOOR CLOSED? → NO

↓

FORMULATE
DEACTIVATE
MESSAGE

↓

SEND MSG
TO CONTROL

↓

STOP
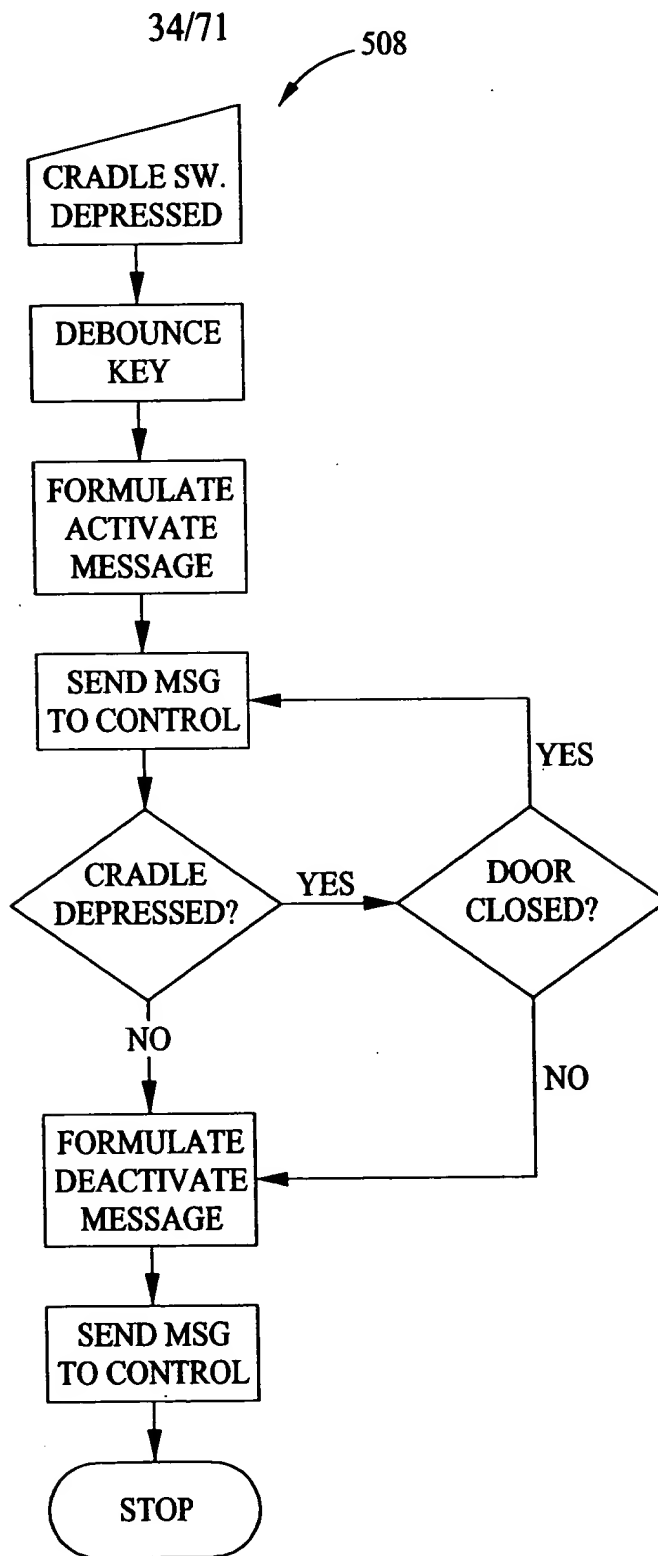
Dispenser Control Algorithm

FIG. 32
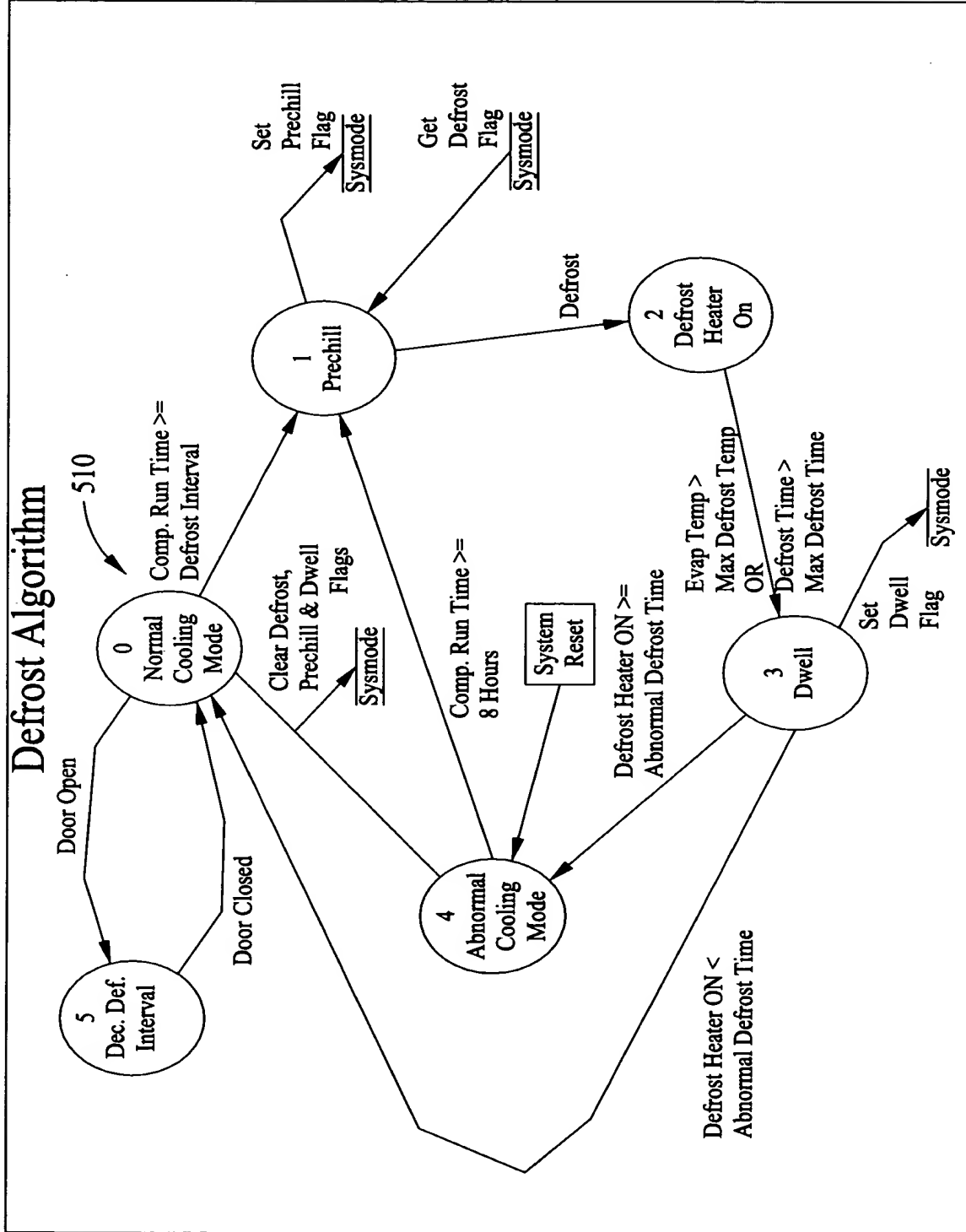
Defrost Control State Diagram

FIG. 33

FIG. 34

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Evap. & Cond.Fan Control:

514

Diagnostics Mode? — **YES**

NO

Disable Diagnostic Circuit

Read Power Supply Voltage

Push Voltage (V) on Queue

Compute Queue Average (A) $\frac{\sum Queue}{Cardinality\ of\ Queue}$

Compute Difference (D) of most recent Queue Value and Previous Queue Value

S.S. Run Time > 1 Hour — **NO**

FZ Temp > 3°Hyst + Set — **NO**

Ambient > 85 Deg. F — **NO**

Turbo Mode — **NO**

Set High Speed K Values

Set Low Speed K Values

Compute PWM Duty Cycle D=KpV+KiA+KdD

Adjust Duty Cycles

Is Sealed System ON — **NO**

Turn Condenser Fan Off

Is Evap Warm or Timeout Elapsed — **YES**

Turn Evap Fan Off

Enable Condensor Output of PWM

Is Evap Cool or Timeout Elapsed

Enable Evap. Output of PWM

Done

Enable Diagnostic Circuit

Read Power Both Supply Voltages (Around Rsense)

Compute Wattage ((V1-V2)^2)/Rsens

Read Expected Motor Wattage and Tolerace From EEPROM

Is Actual Wattage within target range — **YES**

Report Failure   Report Pass

Turn Motors Off

Fan Speed Control

Notes: 1. The FF & Evaporator fans will shut off for the first five minutes that the door is open
2. Only one fan at a time can be on at a time during diagnostics.
3. Once the fan has been switched to high speed, it remains in that state until the operational cycle is complete.

FIG. 35

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—516

Turbo Cool Button
Pressed On HM

Is Turbo LED
Already On

NO

Illuminate
the Turbo
Mode LED
for 8 hours

Shut Off
the Turbo
Mode LED

Set all Fans to
High Speed Mode
and Set the FF Set
point to the user's
selected value or
35 whichever is
less (for 8 hour
period)

Revert to FF & SS
Control Algorithm
& User Defined
Set Points

NO   In defrost?

YES

Turn on
Condenser
fan for 10
Minutes

Turn on
compressor
and all fans
for 10
minutes

Turbo Cycle Algorithm

FIG. 36

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Change Freshness Filter:

Reset button pressed for > 3 Sec. — NO → Has 24 Hr Elapsed — NO

Has 24 Hr Elapsed → Increment day counter → Is number of days>180 — NO → Freshness LED on

Reset Day Counter Back to Zero → Turn Freshness LED on (518) → Delay 2 Seconds → Turn Freshness LED off → Done

Freshness Filter Reminder Algorithm

FIG. 37

Done

Turn Water LED off

Delay 2 Seconds

— 520

Turn Water LED on

Reset Day/Valve Counter Back to Zero

NO

Reset button pressed for > 3 Sec.

NO

Has 24 Hr Elapsed or is water being dispensed?

Increment day/ valve counter

NO

Is number of days>356 or dispenser valve engaged time >7 hrs 56 min

Water LED on

Water Filter Reminder Algorithm

FIG. 38

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SENSOR READ AND ROLLING AVERAGE ALGO:

Read Sensor

Read Alpha, Calibration Slope and Calibration Offset from EEPROM

Let R=RollingAVG
Let SensorVal=
SensorVal*m+b

RollingAVG =
alpha*SensorVal +
(1-alpha)*R

Delay for next read

Sensor Reading Algorithm
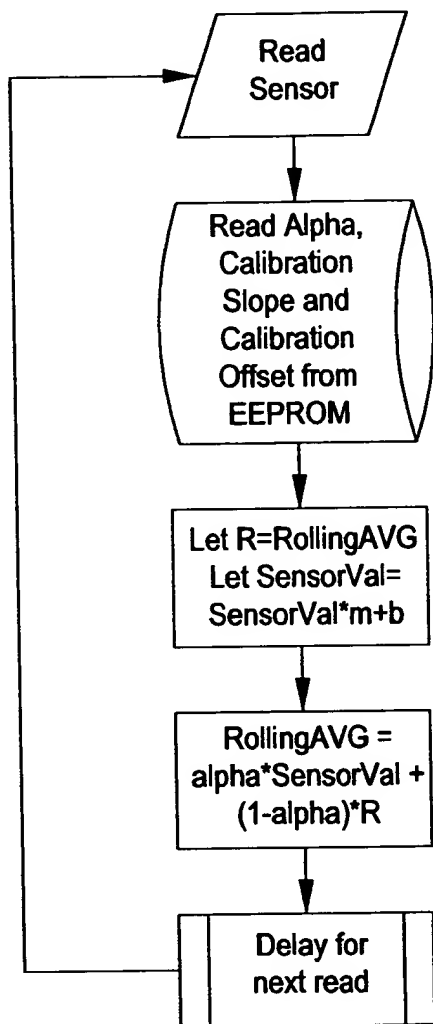
NOTE:

Fresh food average uses this algorithm twice to create a 2nd pole filter.

FIG. 39

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StateCode=I

StateCode=R

Initialize

Run

FIG. 40

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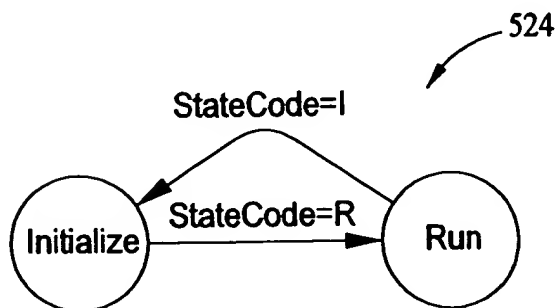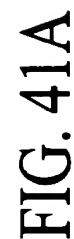
FIG. 41A

Note: Any Routine is allowed to read a data store
The command processor can read or write
any data store.
Dashed line indicates a path for initialization only

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FIG. 41B

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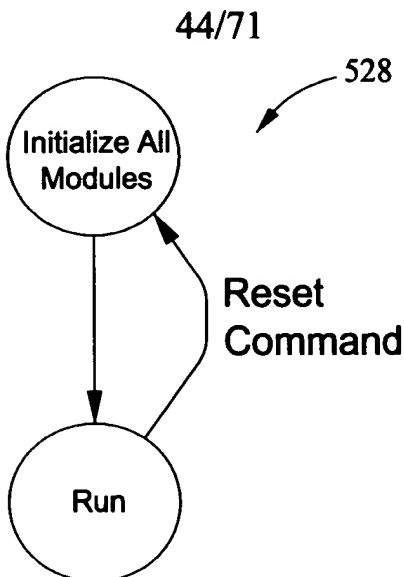
State Diagram For Main Control

FIG. 42

HMI MAIN STATE MACHINE

FIG. 43

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FIG. 44A

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State

State Code

Key Status

Key
Pressed

TO FIG
44A

State Code

Xmit port
avail (Disable
Interrupts)

State Code

Physical xmit
char (Disable
interrupts)

XMIT
Status

State Code

Protocol
Packet
Ready

State Code

Clear Buffer

State Code

Physical Get
RX
Character

RX Buffer

Notes: Keyboard scan should return the last key hit and whether a key is presently
being pressed.

Calls Stack Depth: Main->Diag->Keyboardscan->KeyPressed->Cccom Interrupt->
Physical get character

FIG. 44B

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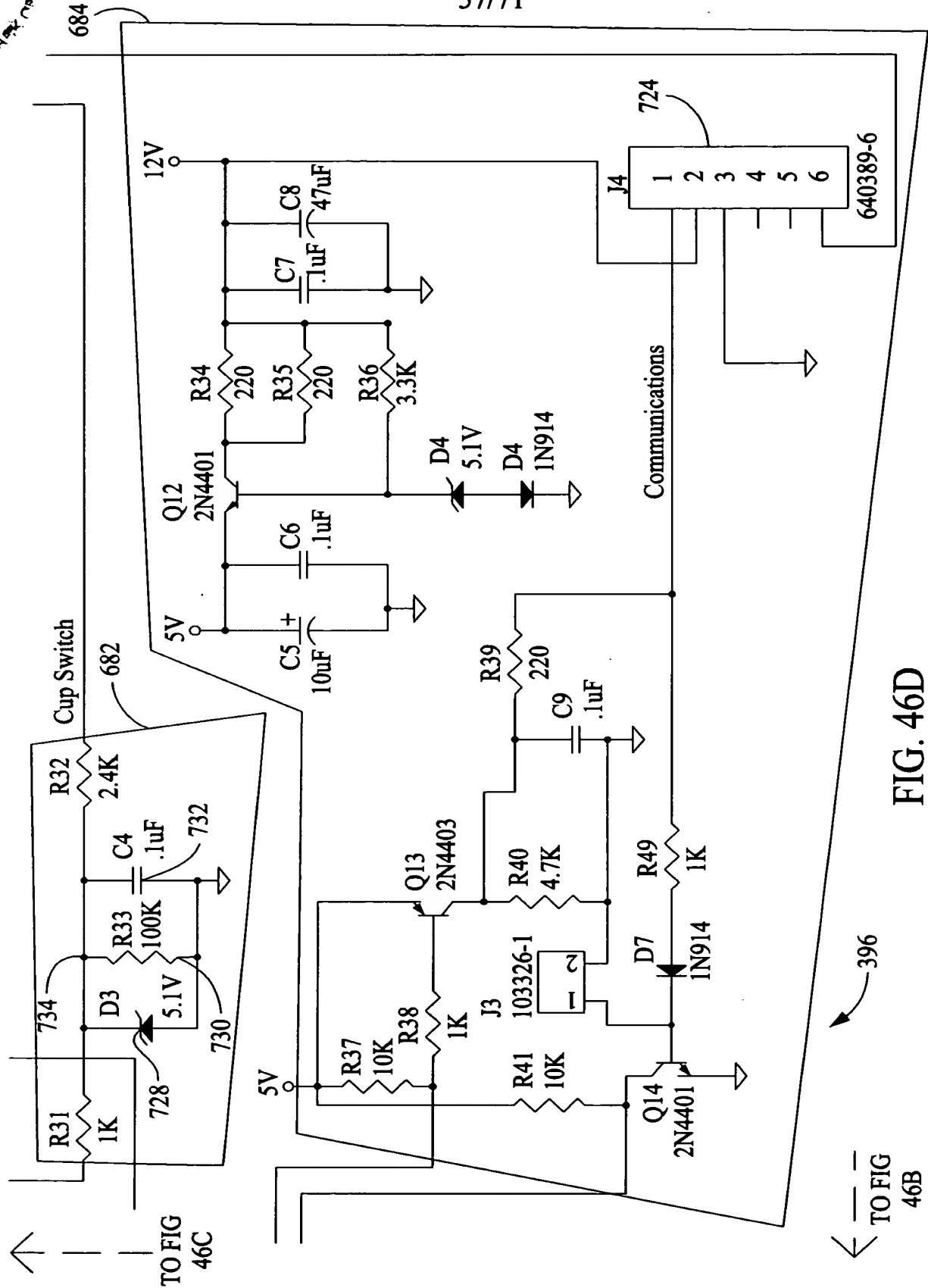St. Louis, MO 63102 (314) 621-5070

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FIG. 45A

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FIG. 45B

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FIG. 45C

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FIG. 45D

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FIG. 45E

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FIG. 45F

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FIG. 45G

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FIG. 46A

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FIG. 46B

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FIG. 46C

A1 2KHz 700
702
11
D1 1N914
D2 1N914
R1 2.4K
Q1 2N4401
R5 10K
676
Beeper
TO FIG 46A
R7 47K
R10 47K
Q4 S-12306DS
S-12307DS
Q7 S-12306DS
S-12306DS
12V
Q3 S-12307DS
Q6 S-12306DS
R9 10K
Q2 2N4403
R6 100K
R8 4.7K
Q5 2N4401
R22 47K
R51 10K
R52 10K
5V
R27 22K
Q9 2N4401
Q10 2N4401
R25 22K
Lamp
Heater

678
640369-2
716
640389-1
712
J2 1 2 3 4
714
12V
D8 1N4007
R18 5.6K 2 watt
Q6 S-12306DS
710
708
706
R16 10K
Q11 S-12306DS
R29 10K
722
720
680
TO FIG 46D

FIG. 46D

FIG. 47A

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FIG. 47B

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FIG. 47C

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FIG. 47D

804

800

808

806

802

806

Contact Construct

Defrost — 810

806

802

806

814

806

816

806

802

Compressor On / FF Open

Compressor Off / FF Open

806

802

806

811

806

812

806

802

Compressor On / FF Closed

Compressor Off / FF Closed

FIG. 48

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Compressor
Condenser Fan

Defrost Heater

MOTORIZED SWITCH

ELECTRONIC CONTROL

FIG. 49

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FIG. 50

FIG. 51

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START

COMPRESSOR ON?

TEMP CAMB 1 ≥ TSET1 + THYS 1?

COMPRESSOR & FANS ─ ON
STORE TEMP OF CAMB2 AS T2 ON
CALC. T2 OFF = T2 SET - (T2 ON - T2 SET)
SET T1 OFF = T1 SET - T1 HYS

TEMP CAMB2 ≥ TSET2 + THYS2?

COMPRESSOR & FANS ─ ON
STORE TEMP CHAMB1 AS T1 ON
CALC T1 OFF = T1SET - (T1 ON - T1 SET)
SET T2 OFF = T2 SET - T2 HYS

TEMP CHAMB1 ≤ T1 OFF?
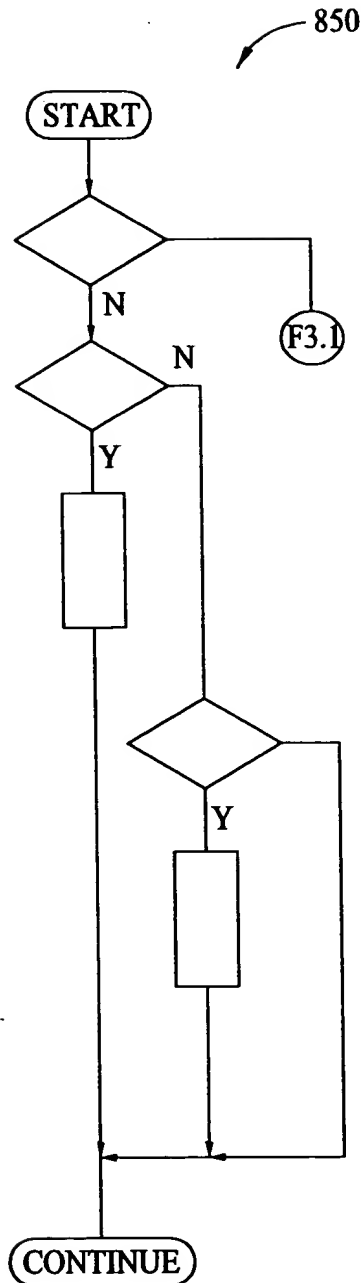
CLOSE DAMPER 1

TEMP CHAMB2 ≤ T2 OFF?

CLOSE DAMPER 2

ALL DAMPERS CLOSED?

TURN OFF COMPRESSOR & FANS

CONTINUE

FIG. 52

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850

START

N

N

Y

F3.1

N

Y

Y

CONTINUE

COMPRESSOR ON?

$T1 \geqslant T1$ MAX

SET DAMPER FOR EQUAL AIR FLOW
TURN COMPRESSOR AND FANS ON
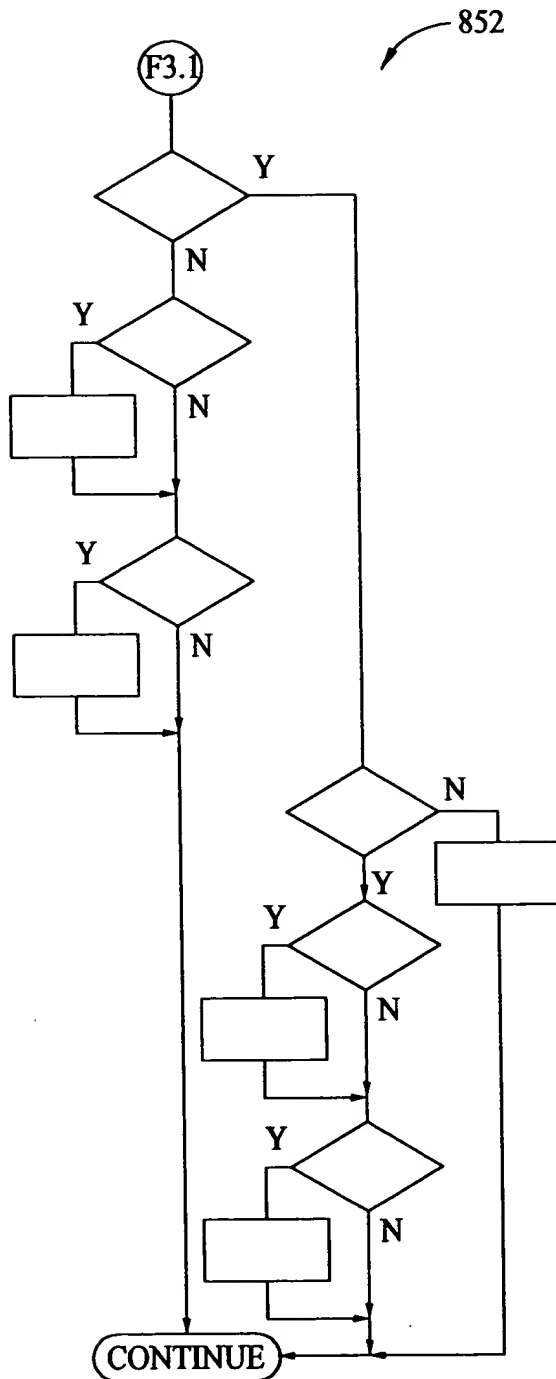SET CONDITION 1 FLAG
SET T2 ON = T2 MAX

$T2 \geqslant T2$ MAX

SET DAMPER TO MAX AIR FLOW
TURN COMPRESSOR AND FANS ON
SET CONDITION 2 FLAG
SET T1 ON = T1

FIG. 53

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(F3.1)

CONDITION 1 FLAG SET?

T2 $\leqslant$ T2 SET - (T2 ON - T2 SET)?

CLOSE DAMPER

T1 $\leqslant$ T1 MIN?

TURN COMPRESSOR AND FANS OFF
RESET CONDITION 1 FLAG

CONDITION 2 FLAG SET?

ERROR - RESTART COMPUTER

T2 $\leqslant$ T2 MIN?

CLOSE DAMPER

T1 $\leqslant$ T1 SET - (T1 ON - T1 SET)?

TURN COMPRESSOR AND FANS OFF
RESET CONDITION 2 FLAG

CONTINUE

FIG. 54

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860

870
DUCT

DIVERTER

864

CTL

CHAMBER 1   S1   868

CHAMBER 2   S2   866

FAN
EVAP   MC

872

FIG. 55

860

DUCT

870

864

CTL

CHAMBER 1   868

DIVERTER

CHAMBER 2   866

FAN

872

EVAPORATOR

FIG. 56

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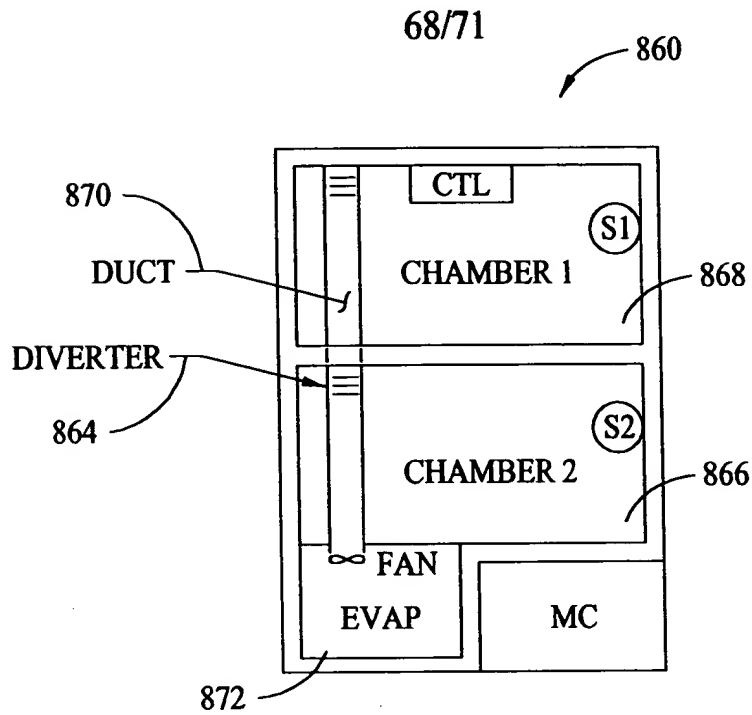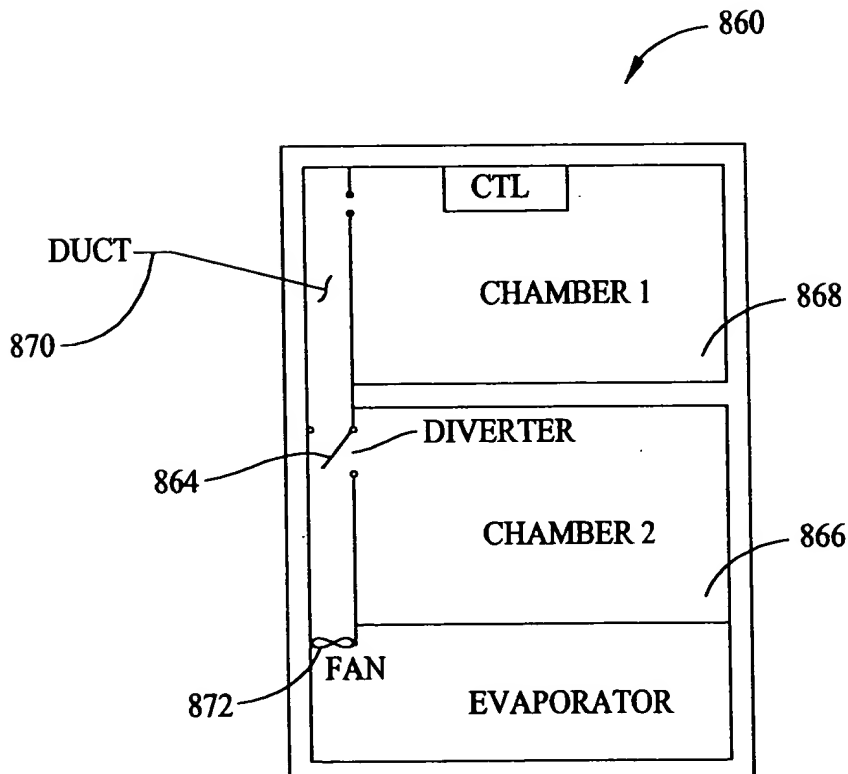
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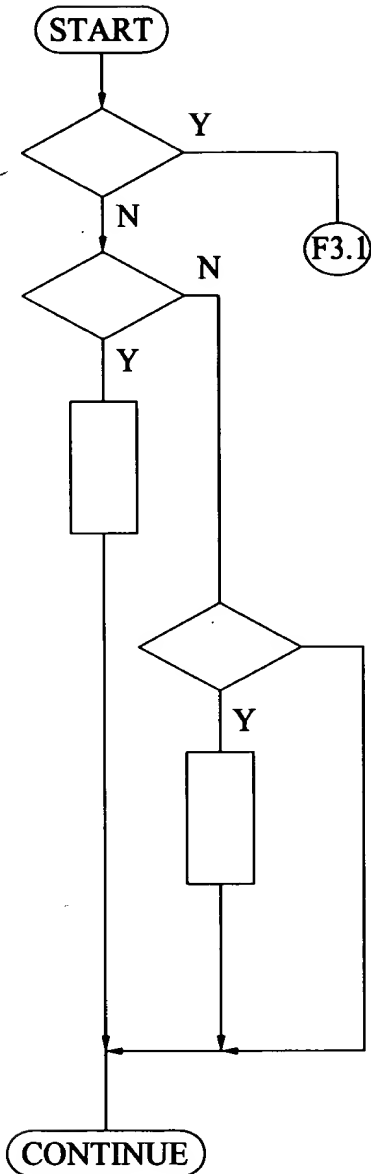
COMPRESSOR ON?

$T1 \geqslant T1$ MAX

SET DIVERTER FOR EQUAL AIR FLOW
TURN COMPRESSOR AND FANS ON
SET CONDITION 1 FLAG
SET T2 ON = T2

$T2 \geqslant T2$ MAX

SET DIVERTER FOR EQUAL AIR FLOW
TURN COMPRESSOR AND FANS ON
SET CONDITION 2 FLAG
SET T1 ON = T1

FIG. 57

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CONDITION 1 FLAG SET?

DIVERTER AT MID POSITION?

T2 < T2 SET - (T2 ON - T2 SET)?

BLOCK CHAMBER 2
SET C2 SAT FLAG

T1 < T1 MIN?

BLOCK CHAMBER 1
SET C1 SAT FLAG

C1 SAT = TRUE AND T2 < T2 SET - (T2 ON - T2 SET)?

C2 SAT = TRUE AND T1 < T1 MIN?

TURN COMPRESSOR AND FANS OFF
RESET CONDITION 1, C1 SAT AND C2 SAT FLAGS

FIG. 58

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F3.2

RESET

CONTINUE

CONDITION 2 FLAG SET?

ERROR

DIVERTER AT MID POSITION?

T1 < T1 SET - (T1 ON - T1 SET)?

BLOCK CHAMBER 1
SET C1 SAT FLAG

T2 < T2 MIN?

BLOCK CHAMBER 2
SET C1 SAT FLAG

C1 SAT = TRUE AND T1 < T1 SET - (T1 ON - T1 SET)?

C2 SAT = TRUE AND T2 < T2 MIN?

TURN COMPRESSOR AND FANS OFF
RESET CONDITION 2, C1 SAT AND C2 SAT FLAGS

FIG. 59